NU Econ 101: Lecture 1

Lecturer: Shane Auerbach

Tue 31/05/16

Where are we now?

What is economics?

Economics is the study of how individuals and societies **choose** to use the **scarce** resources that nature and previous generations have provided.

Choice: How do individuals and societies make choices?

$$\max_{\text{choices}} \text{something(choices)}$$

Scarcity: Without scarcity, the problem is unconstrained optimization. With scarcity:

subject to constraints on choices.

Microeconomics and macroeconomics

Microeconomics

The branch of economics that examines the functioning of individual industries and the behavior of individual decision-making units, i.e., firms and households.

Macroeconomics

The branch of economics that examines the economic behavior of aggregates–income, employment, output, etc.–on a national scale.

Where are we now?

Course website

Course website:

http://www.shaneauerbach.com/teaching/16su101

All important materials will be posted here.

We will not use Moodle.

Class times, office hours, and introductions

Class times: Tuesday, Wednesday, Thursday 12:30-14:15 and 14:30-16:15

Class location: NU SHSS 8.154

Office hours: Tuesday, Wednesday, Thursday 09:00-10:30

Office location: 8209

Introductions: 10-15 minute meetings with each student. Use sign-up sheet in class.

Exams, problem sets, and grading

- PS1 due Tuesday, June 7
- PS2 due Tuesday, June 14
- Midterm exam on Tuesday, June 21 (in class)
- PS3 due Tuesday, June 28
- PS4 due Tuesday, July 5
- PS5 due Tuesday, July 12
- Final exam on Monday, July 18 (time and location TBD)

Problem sets **due beginning of class**. Can work in groups up to 3 people. To be assigned to a group:

http://www.shaneauerbach.com/grouprequest

See syllabus for further grading details.

Textbook, readings, accommodations, and integrity

The **textbook** for this course:

Principles of Economics, 10.e., by Case, Fair, and Oster

Many copies in library available for checkout.

Readings listed in syllabus are to be done **before** the lecture.

Contact me immediately regarding **accommodations** for disabilities.

Cheating is bad.

Course outline

1. Part 1: Consumer theory
   - How do individuals/consumers/households make choices?
2. Part 2: Producer theory in perfect competition
   - Given perfect competition, how do firms make choices?
3. Part 3: Market equilibrium, imperfections, and government
   - What happens when consumers and firms interact?
   - Markets: When do they work and when do they fail?
   - What happens without perfect competition?
   - What role should government play?

Where are we now?

A notation for preferences

Let X denote a set of options (or states of the world).

Weak preference relation

Let $x \in X$ and $y \in X$ denote two distinct options:

- $x \succeq_i y$ means that, for agent i, x is weakly preferred to y.

We may call $\succeq_i$ agent i's *preference relation*.

Indifference and strict preferences

- $x \sim y \iff (x \succeq y \wedge y \succeq x)$
- $x \succ y \iff (x \succeq y \wedge y \not\succeq x)$

Economists typically take preferences as exogenous/given.

Example of preferences

$X = \{$**W**atch a movie, **R**ead a book, **B**rowse the internet$\} = \{w, r, b\}$

Match the agents:

- Anna's first choice is w. If she cannot have w, she is indifferent between r and b.
- Bob prefers r to w and b and prefers b to w.
- Claude dislikes w, preferring both other options, and weakly prefers r to b.
- Deborah is indifferent between all options.

With their preferences:

- $r \succeq b \succ w$ Solution: Claude
- $w \prec b \prec r$ Solution: Bob
- $w \succ b \sim r$ Solution: Anna
- $w \sim r \sim b$ Solution: Deborah

Rationality

Two assumptions on preferences:

1. $\succeq$ on X is **complete** if, for any $x, y \in X$, either $x \succeq y$ or $y \succeq x$ (or both).
2. $\succeq$ on X is **transitive** if, for any $x, y, z \in X$, $(x \succeq y \wedge y \succeq z) \Longrightarrow x \succeq z$.
   - Or, for strict relations:
     - $(x \succ y \wedge y \succ z) \Longrightarrow x \succ z$
     - $(x \sim y \wedge y \sim z) \Longrightarrow x \sim z$
     - $(x \succ y \wedge y \sim z) \Longrightarrow x \succ z$
     - $(x \sim y \wedge y \succ z) \Longrightarrow x \succ z$

Rationality

$\succeq$ on X is **rational** if it is complete and transitive.

A blind date experiment (1)

Your friend is offering to set you up with either Adam/Anna or Bill/Brenda:

Adam/Anna:	very intelligent, plain-looking, well-off
Bill/Brenda:	intelligent, very good-looking, poor

Which one would you pick? Write down:

- 1 if you pick Adam/Anna
- 2 if you pick Bill/Brenda

A blind date experiment (2)

Your first date failed, so your friend offers to set you up again:

Eric/Elizabeth:	fairly intelligent, good-looking, rich
Christian/Christina:	intelligent, very good-looking, poor

Next to your first digit, write down:

- 1 if you pick Christian/Christina (!! order reversed)
- 2 if you pick Eric/Elizabeth (!! order reversed)

You should now have a two-digit number.

A blind date experiment (3)

Your second date also didn't work out, so one more try:

Ricardo/Rebecca:	fairly intelligent, good-looking, rich
Nathan/Naomi:	very intelligent, plain-looking, well-off

Now add a third digit to the number you have so far:

- 1 if you pick Ricardo/Rebecca
- 2 if you pick Nathan/Naomi

You should now have a three-digit number.

A blind date experiment (Results)

There are eight three-digit numbers that you could have:

- 111 (18%)
- 112 (40%)
- 121 (23%)
- 122 (2%)
- 211 (0%)
- 212 (11%)
- 221 (6%)
- 222 (0%)

But it turns out that 111 and 222 actually violate transitivity!

111 implies:

$$(VI, PL, WO) \succ (I, VGL, P) \succ (FI, GL, R) \succ (VI, PL, WO)$$

Where are we now?

The problem, a thought experiment, and an answer

The problem:

- Modeling choices through preference relations is clunky.

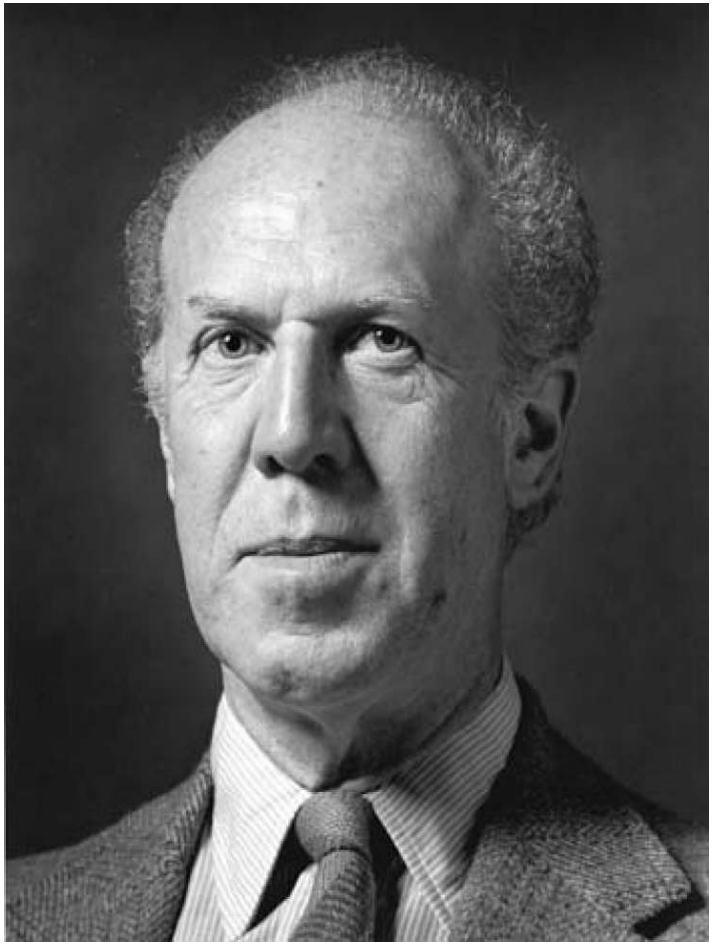
The thought experiment:

- Suppose we want to represent a person's preference relation ($\succeq$) with a numeric *utility function* such that $u(x) > u(y)$ if and only if $x \succ y$. Can we?

The answer:

- If $\succeq$ is rational (complete and transitive) and continuous (an additional assumption): YES!

Gérard Debreu



Gérard Debreu

The *ordinal* utility function

$$u : X \to \mathbb{R}$$

In English:

- u is a function
- You put in an option/alternative.
- It spits out a real number.

Debreu proves that, for any preference relation ($\succeq$) that meets his conditions, there exists a continuous *ordinal* utility function (u) such that, for all $x, y \in X$:

$$u(x) > u(y) \iff x \succ y$$

Ordinal utility: an example

An example:

- Suppose $u_i(\text{gun}) = 4$ and $u_i(\text{lollipop}) = 2$.
- Note that $u_i(\text{gun}) > u_i(\text{lollipop})$.
- This means that i likes the gun more than the lollipop.
- That is, gun $\succ_i$ lollipop.

A question:

- $u_i(\text{gun})$ is twice as big as $u_i(\text{lollipop})$.
- Does this mean that i likes the gun *twice as much*?
- Answer: NO!

Uncertainty

How do we assign utility values to lotteries?

- Again, let $u_i(\text{gun}) = 4$ and $u_i(\text{lollipop}) = 2$.
- Let L be a lottery ticket such that i wins either the gun or the lollipop, each with 50% probability.
- What is $u_i(L)$?

John von Neumann and Oskar Morgernstern

John von Neumann

Oskar Morgernstern

The von Neumann-Morgernstern utility theorem

What we need:

- A couple extra assumptions on $\succeq$ relating to lotteries.

What the theorem gives:

- A *cardinal* utility function representation
  - Now we can say that the gun is twice as good as the lollipop.
- Expected utility maximization
  - We can also say that $u(L) = 3$.
  - Come back to this in intermediate micro. ☺

Choice with utility functions

Suppose:

- Agent i has utility function u_i.
- Agent i has two options, i.e. $X = \{x_1, x_2\}$
- $u_i(x_1) = 7$ and $u_i(x_2) = 4$.

What should i pick?

$$7 = \max_{x \in X} u_i(x), \qquad x_1 = \arg\max_{x \in X} u_i(x)$$

In English: 7 is the maximum utility agent i can get from his choices. x_1 is the option (or argument) that maximizes $u_i(x)$, achieving $u_i(x_1) = 7$. **Agents choose by maximizing utility!**

The significance

Why does all of this matter?

- We know people have preferences that we can model with $\succeq$.
  - I can ask you if you prefer the gun or the lollipop.
- It would be easier to model peoples' choices if they all had utility functions and made decisions by maximizing them.
  - You will see this throughout this term.
- These results prove that people with preferences meeting minor assumptions will behave **as if** they were maximizing utility functions.

We don't believe that people make decisions by maximizing utility functions, but we can model them as if they did.

Where are we now?

Review of reading (1)

Why study economics?

- To learn a way of thinking
- To understand global affairs
- To be an informed citizen

Review of reading (2)

Key concepts:

Opportunity cost

The best alternative that we forgo, or give up, when we make a choice or a decision.

Marginalism

The process of analyzing the additional or incremental costs or benefits arising from a choice or decision.

Efficient market

A market in which profit opportunities are eliminated almost instantaneously.

Review of reading (3)

Key concepts:

Descriptive economics

The compilation of data that describe phenomena and facts.

Economic theory

A statement or set of related statements about cause and effect, action and reaction.

Review of reading (4)

Key concepts:

Model

A formal statement of a theory, usually a mathematical statement of a presumed relationship between two or more variables.

Variable

A measure that can change from time to time or from observation to observation.

Ockham's (or Occam's) razor

Book says: "The principle that irrelevant detail should be cut away." I say: "The simplest solution is most often the best."

Review of reading (5)

Key concepts:

Ceteris paribus (or all else equal)

A device used to analyze the relationship between two variables while the values of other variables are held unchanged.

Review of reading (6)

Key concepts:

Efficiency

Book says: "In economics, allocative efficiency. An efficient economy is one that produces what people want at the least possible cost." I say: "That's part of it, but we'll define it better later on."

Equity

Book says: "Fairness." I say: "Well, kinda..."

Where are we now?

Discussion

Where does economics fit within the hard and social sciences?

Where are we now?

Next time

Next class: Tomorrow

Reading: Pages 1-14 of Friedman (1953). Find it at:

http://www.shaneauerbach.com/teaching/16su101

Plan:

- Discuss Friedman's article.
  - Positive and normative economics
  - Models and assumptions
- More on utility functions.